# QUESTION BANK

**Class & Semester:**  II BTech, I Semester
**Subject Name:**  Data Structures
**Subject Code:**  S23AM302PC
**Blooms Taxonomy Levels (BTL)**

1. Remembering
2. Understanding
3. Applying
4. Analyzing
5. Evaluating
6. Creating

# PART –B

- **10 - Long Questions from each Unit**

| Q. No. | Questions | Blooms Taxonomy Levels | CO's | PO'S |
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| | **Unit-1** | | | |
| 1 | Explain the Insert and Delete operations in a Singly Linked List. | **Level-2** | CO1 | 1, 2 |
| 2 | Write an algorithm to insert new node at the beginning, at middle position and at the end of a Singly Linked List. | **Level-3** | CO1 | 1, 2, 3 |
| 3 | Explain the search and display operations in a Singly Linked list. | **Level-1** | CO1 | 1, 2 |
| 4 | Define Stack? Explain all the primitive operations performed on a stack. | **Level-1** | CO1 | 1, 2 |
| 5 | The following numbers 10, 20, 50, 30, 90, 60 (Top) are present in a stack of size 10. Perform the following operations in sequence. pop(), push(30), push(40), pop(), push (60), pop(), pop(), pop() What is the peek element at last? Draw and explain it. | **Level-1** | CO1 | 1, 2 |
| 6 | Transform the expression into its equivalent post fix expression: K + L - M*N + (O^P) * W/U/V * T + Q | **Level-2** | CO1 | 1, 2, 3 |
| 7 | Convert following expression A+B*(C^D-E) in to postfix form. | **Level-2** | CO1 | 1, 2, 3 |
| 8 | Explain the procedure to evaluate postfix expression 12 2 / 34 20 - + 5 +. | **Level-3** | CO1 | 1, 2, 3 |
| 9 | Convert the infix expression a / b – c + d * e – a * c into postfix expression and trace that postfix expression for given data a = 6, b = 3, c = 1, d = 2, e = 4. | **Level-3** | CO1 | 1, 2, 3 |
| 10 | Explain different operations on a Queue using Singly Linked List. | **Level-3** | CO1 | 1, 2, 3 |
| | **Unit-2** | | | |
| 1 | Explain different operations performed on dictionaries on linked representation. | **Level-2** | CO2 | 1, 2 |
| 2 | Explain how Insertion, Deletion and Search is done in skip lists with example. | **Level-2** | CO2 | 1, 2 |
| 3 | What is a hash function? Explain types of hash functions. | **Level-1** | CO2 | 1, 2 |
| 4 | What is hashing? Insert the following list of elements into the hash table by using Linear Probing (size of the hash table is 10) {43, 135, 72, 23, 99, 19, 82} | **Level-3** | CO2 | 1, 2, 3 |
| 5 | Insert the following list of elements into the Hash table by using Quadratic probing (size of the table is 10) {42, 16, 91, 33, 18, 27, 36, 62} | **Level-3** | CO2 | 1, 2, 3 |
| 6 | Explain the algorithm for implementing quadratic probing on a hash table. | **Level-2** | CO2 | 1, 2 |
| 7 | Construct the hash table for the data: 20, 34, 45, 70, 56 using any hash function under division method by following double hashing technique. | **Level-3** | CO2 | 1, 2, 3 |
| 8 | Using extendable hashing, hash the following data using h(k) where: | **Level-3** | CO2 | 1, 2, 3 |

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| | Data = {16, 4, 6, 22, 24, 10, 31, 7, 9, 20, 26}<br>Bucket limit = 3 | | | |
| 9 | Insert the following sequence of keys in the hash table 24, 19, 32, 44, 56. Use separate chaining technique for collision resolution. Hash Table Size = 6 | Level-3 | CO2 | 1, 2, 3 |
| 10 | Consider we have to insert the elements 13, 15, 26, 6, 23, 24 and 7.<br>Table size is 7 using rehashing technique. | Level-3 | CO2 | 1, 2, 3 |

## Unit-3

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| 1 | Write an algorithm to insert an element into a binary search tree. | Level-2 | CO3 | 1, 2 |
| 2 | Create binary search tree for the following elements (45, 15, 79, 90, 10, 55, 12, 20, 50). Discuss about the height of the above binary search tree. | Level-3 | CO3 | 1, 2, 3 |
| 3 | Explain deletion operation in Binary Search Tree. | Level-2 | CO3 | 1, 2 |
| 4 | Construct a Binary Search Tree by inserting the following sequence of elements 10, 12, 5, 4, 20, 8, 7, 15, 13 starting from an empty tree. | Level-3 | CO3 | 1, 2, 3 |
| 5 | Write an algorithm for search operation in Binary search tree? Demonstrate it with an example. | Level-3 | CO3 | 1, 2 |
| 6 | Explain Depth First Search (InOrder, PreOrder and postOrder) traversal techniques with example. | Level-2 | CO3 | 1, 2 |
| 7 | What is an AVL Tree? Construct an AVL tree for the following elements:  H, I, J, B, A, E, C, F, D, G, K, L | Level-3 | CO3 | 1, 2, 3 |
| 8 | A binary tree has 9 nodes. The inorder and postorder traversal sequences are given below. Give the preorder traversal.<br>     Inorder: 4, 2, 5, 1, 6, 3, 7<br>     Postorder: 4, 5, 2, 6, 7, 3, 1 | Level-3 | CO3 | 1, 2, 3 |
| 9 | Explain different operations on a B-tree. Demonstrate it with an example. | Level-3 | CO3 | 1, 2 |
| 10 | Explain insertion operation of Red Black tree.  Create a RED BLACK Tree by inserting following sequence of elements 10, 18, 7, 15, 16, 30, 25, 40 and 60 | Level-3 | CO3 | 1, 2, 3 |
| 11 | Explain different rotations on a SPLAY Tree. Construct a SPLAY Tree by inserting following sequence of elements 15, 10, 17, 7. | Level-3 | CO3 | 1, 2, 3 |

## Unit-4

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| 1 | Define a graph data structure. Explain the types of graphs with suitable examples. | Level-2 | CO4 | 1, 2 |
| 2 | Describe various ways to represent a graph with suitable examples. | Level-2 | CO4 | 1, 2, 3 |
| 3 | Explain various graph traversal algorithms (BFS and DFS) with suitable examples. | Level-2 | CO4 | 1, 2 |
| 4 | Demonstrate the technique of quick sort. Sort the following elements using quick sort. 24, 9, 29, 14, 19, 27. | Level-3 | CO4 | 1, 2, 3 |
| 5 | Demonstrate the technique of merge sort. Sort the following elements using merge sort. 36, 25, 40, 2, 7, 80, 15. | Level-3 | CO4 | 1, 2, 3 |
| 6 | Demonstrate the technique of Heap sort. Sort the following elements using Heap. 81, 89, 9, 11, 14, 76, 54, 22. | Level-3 | CO4 | 1, 2, 3 |
| 7 | Illustrate the heap-sort on the following input sequence:<br>(4, 3, 7, 1, 8, 5) | Level-2 | CO4 | 1,2 |
| 8 | Explain External sorting? What is model for external sorting. | Level-1 | CO4 | 1, 2 |
| 9 | Explain Merge Sort with an example and Write a C program to implement Merge sort? | Level-3 | CO4 | 1, 2 |
| 10 | Explain Quick Sort with an example and Write a C program to implement Quick sort? | Level-3 | CO4 | 1, 2 |

## Unit-5

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| 1 | What do understand by pattern matching? Describe Brute-Force algorithm with suitable example. | Level-2 | CO5 | 1, 2, 3 |

| 2 | Demonstrate Boyer-Moore algorithm with suitable example. | Level-3 | CO5 | 1, 2, 3 |
|---|---|---|---|---|
| 3 | Demonstrate Knuth-Morris-Pratt (KMP) algorithm with suitable example. | Level-3 | CO5 | 1, 2, 3 |
| 4 | Define tries? Describe various applications of Tries. | Level-2 | CO5 | 1, 2 |
| 5 | How to build a suffix tries for a given text? Also explain how to search a pattern in the built suffix tries? | Level-2 | CO5 | 1, 2 |
| 6 | Draw the Standard Trie and Compressed Trie for the following Strings {bear, bell, bid, bull, buy, sell, stock, stop} | Level-3 | CO5 | 1, 2, 3 |
| 7 | Difference between Standard trie, Compact trie, and Suffix trie | Level-4 | CO5 | 1, 2, 3 |